JANUARY 1978
No. 1

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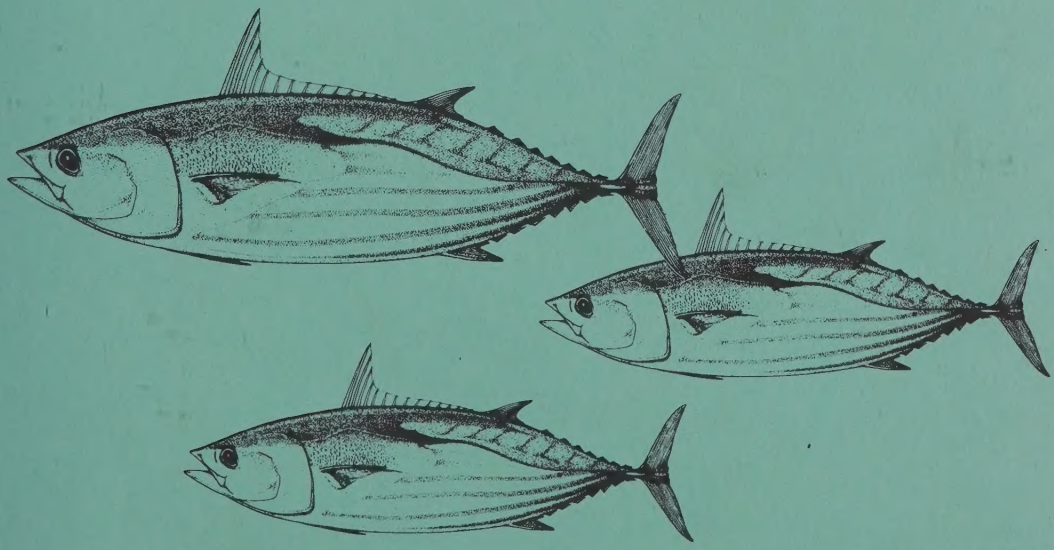

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FISHING INFORMATION

JANUARY 1978, No. 1

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PREFACE

This publication, Fishing Information, appears monthly and contains 1) fishery advisory information, 2) a narrative description of pertinent surface temperature conditions, 3) charts of winds and pressures for the eastern North Pacific, 4) charts of sea surface temperature for the North Pacific and eastern tropical Pacific, and 5) charts of subsurface temperature structure in the eastern North Pacific.

A supplement to Fishing Information appears at 15-day intervals throughout the year. It contains a chart of sea surface temperature (contoured at 2°F (1°C) intervals) from Baja California to Vancouver Island out to about 135°W. Special bulletins are published in conjunction with the 15-day sea surface temperature charts which include short-term projections of albacore distribution and locations of productive fishing areas, information on oceanographic and atmospheric conditions, and other information as is appropriate during the albacore fishing season.

Submitted for publication - February 24, 1978

CONTENTS

		Page
Acknowledgements		iv
Sea Surface Temperature and Environmental Conditions - January 1978, Forrest R. Miller		1
ENVIRONMENTAL CHARTS, PACIFIC OCEAN - January 1978		
Figure 1.	Eighteen-year mean (1961-1978) observed sea level values of barometric pressure (millibars), resultant wind direction (degrees true), resultant wind speed (knots) and average winds speed (knots) regardless of direction.	4
Figure 2.	Observed sea level values of barometric pressure (millibars), resultant wind direction (degrees true), resultant wind speed (knots) and average wind speed (knots) regardless of direction.	5
Figure 3.	Mean sea surface temperature, eastern North Pacific Ocean. Square shows temperatures at weathership station. Numerals on shore are temperatures at coastal and lightship stations.	6
Figure 4.	Mean sea surface temperature chart, western North Pacific Ocean.	7
Figure 5.	Deviation of sea surface temperatures, eastern North Pacific Ocean from 20-year mean (1948-67). Hatched areas are colder in 1978.	8
Figure 6.	Deviation of sea surface temperatures, western North Pacific Ocean from 20-year mean (1948-67). Hatched areas are colder in 1978.	9
Figure 7.	Deviation of sea surface temperatures, eastern North Pacific Ocean from those of January 1977. Hatched areas are colder in 1978.	10
Figure 8.	Mean sea surface temperatures, eastern tropical Pacific Ocean.	11
Figure 9.	Deviation of sea surface temperatures, eastern tropical Pacific Ocean from 20-year mean (1948-67). Shaded areas are colder in 1978. Contours are dashed in sparse data areas.	12
Figure 10.	Surface temperature and salinity and subsurface temperature structure from expendable bathythermograph observations between San Francisco and Honolulu January 7-13, 1978.	13

ENVIRONMENTAL CHARTS ANALYZED BY:

F. Miller (Figures 8 and 9)
J. Renner (Figures 1, 2, 3, 4, 5, 6, 7, and 15 day Supplement)

TECHNICAL EDITOR:
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National Weather Service, San Diego, California and Washington D.C.
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Fisheries Research Board of Canada, Pacific Environment Institute, West Vancouver, British Columbia by L.F. Giovando from observations by:
J. Redhead at Langara Island Light; C.T. Hilliar at Cape St. James Light;
L. Collins at Kains Island Light; E.M. Chapman and M.V. Stewart at Amphitrite Point Light

Scripps Institution of Oceanography, La Jolla, California

Expendable bathythermograph and salinity observations are made by the mates and engineers of the *Hawaiian Queen* of the Matson Navigation Co. The data are processed under supervision of D.R. McLain at the NMFS Pacific Environmental Group, Monterey, California, using computer facilities of the Fleet Numerical Weather Central, Monterey. The project is partially supported by the National Science Foundation and the Office of Naval Research.

Sea Surface Temperature and Environmental Conditions

Forrest R. Miller

Eastern North Pacific

During January the Aleutian low pressure center is normally near 50°N in the central Pacific and the eastern Pacific high pressure center is near 32°N, 130°W. Surface wind, weather and ocean mixing is more dynamic in the region between the Aleutian low and the Pacific high pressure centers, especially where the pressure contours are close together (Figure 1). Normally, the storm tracks move eastward between the two pressure systems.

In January 1978 the Aleutian low pressure center was near its normal position with central pressures 10 to 12 millibars below normal. A surface trough of low pressure persisted from the Aleutian low center to about 35°N, 130°W (Figure 2). The eastern Pacific high pressure center was displaced southeastward to near 25°N, 125°W by the frequent movement of storms from the central Pacific along tracks which were 5° to 10° of latitude farther south than normal. Because of the frequent intensification of Pacific storms south of 40°N and east of 145°W, the monthly mean surface pressure pattern in January 1978 showed a large negative pressure departure from normal over the eastern Pacific from 30°N to 50°N and east of 140°W (compare Figures 1 and 2). In this region strong southerly winds were generated ahead of each storm. As a result, the more typical southward transport of water was inhibited in the surface layers along the U.S. west coast (California current).

The heavy storm activity in the eastern Pacific helped to minimize cooling of the SST's and produce less southward bending of the SST contours along the U.S. west coast (Figure 3). The result was the development of positive SST departures greater than 1°C from normal along the coast and extending southwest from northern Baja California (Figure 5). In December 1977 most of this area showed negative SST departures except along Baja California south of 30°N, where positive departures had persisted for 2 months. In January 1977 there were positive SST departures along the U.S. west coast also. However, in January 1978 the departures were slightly larger (Figure 7) because of the effects of strong southerly surface winds associated with the more southerly storm tracks. The effects of a large number of weather fronts moving across the eastern Pacific south of 40°N was reflected in the SST pattern (Figure 3) and departures from normal (Figure 5) from 30°N to 40°N west of 140°W. The large elongated area with negative departures greater than 1°C (Figure 5) developed along the periphery of the storm centers, where heavy frontal cloudiness and high winds caused SST's to cool faster than the normal seasonal rate. The negative departures of greater than 1°C shown in Figure 7 extend from the central Pacific at 30°N northeastward to the U.S. northwest coastal region because in January 1977 there were no low latitude storms, and almost all of the storms reaching the northwest coast were weak. In contrast, by January 1978 there was a high frequency of intense storms penetrating the entire west coast from British Columbia to Baja California.

Western North Pacific

During January the Aleutian low pressure system is normally centered over the central north Pacific north of 45°N. Along the western periphery of the Aleutian low, storms develop periodically and move eastward, causing wide bands of rough seas and deep ocean mixing from the strong surface winds associated with weather fronts.

During January 1978 most of the western Pacific north of 30°N was dominated by the Aleutian low system which showed only slight departures from normal in location and sea level pressure. The north Pacific ocean front was stronger than normal from 38°N to 43°N between Japan and 160°E (Figure 4). In this area, positive SST departures from normal (Figure 6) covered the same areas

as in December 1977, but the magnitude was reduced to one half. The positive SST departures east of Japan in both months were probably associated with more northward transport of warmer water than normal in the Japanese (Kuroshio) Current. This event was more pronounced along the east coast of Japan in December 1977 than in January. East of 160°E the north Pacific Ocean front was more diffuse between 37°N and 45°N, partly because of the large number of new storm centers which developed around 40°N, 160°E and intensified while moving eastward. The areas of negative SST departures from normal north of 40°N (Figure 6) were associated with high winds and deep ocean mixing which occurred as each new storm developed. Farther south, between 20°N to 35°N and east of 150°E, the large areas of negative SST departures were similar to those in December and were directly associated with strong surface winds, rough seas and extensive cloud cover along weather fronts, which extended in almost continuous bands from the central Pacific to the western Pacific at 20°N.

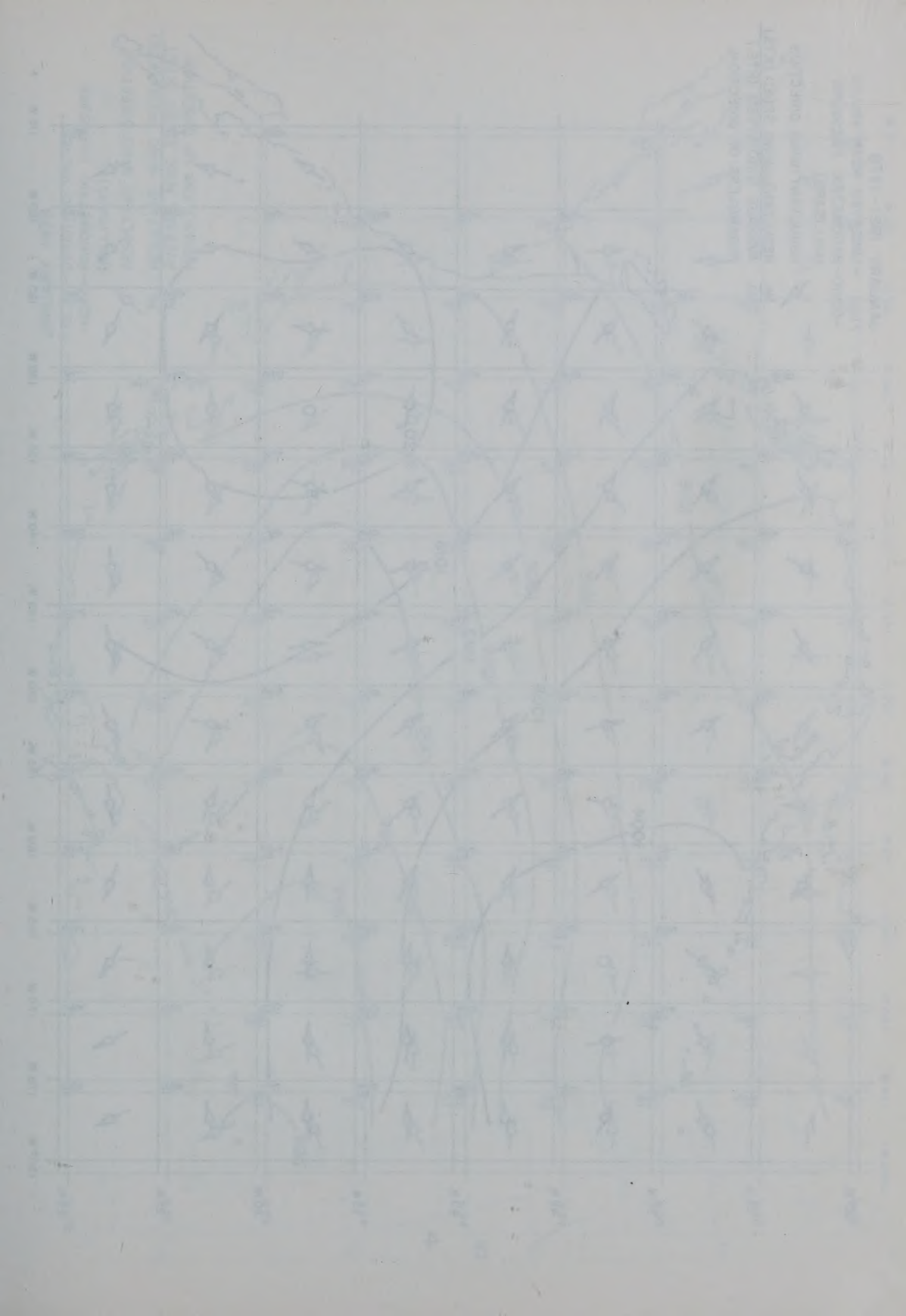
Eastern Tropical Pacific

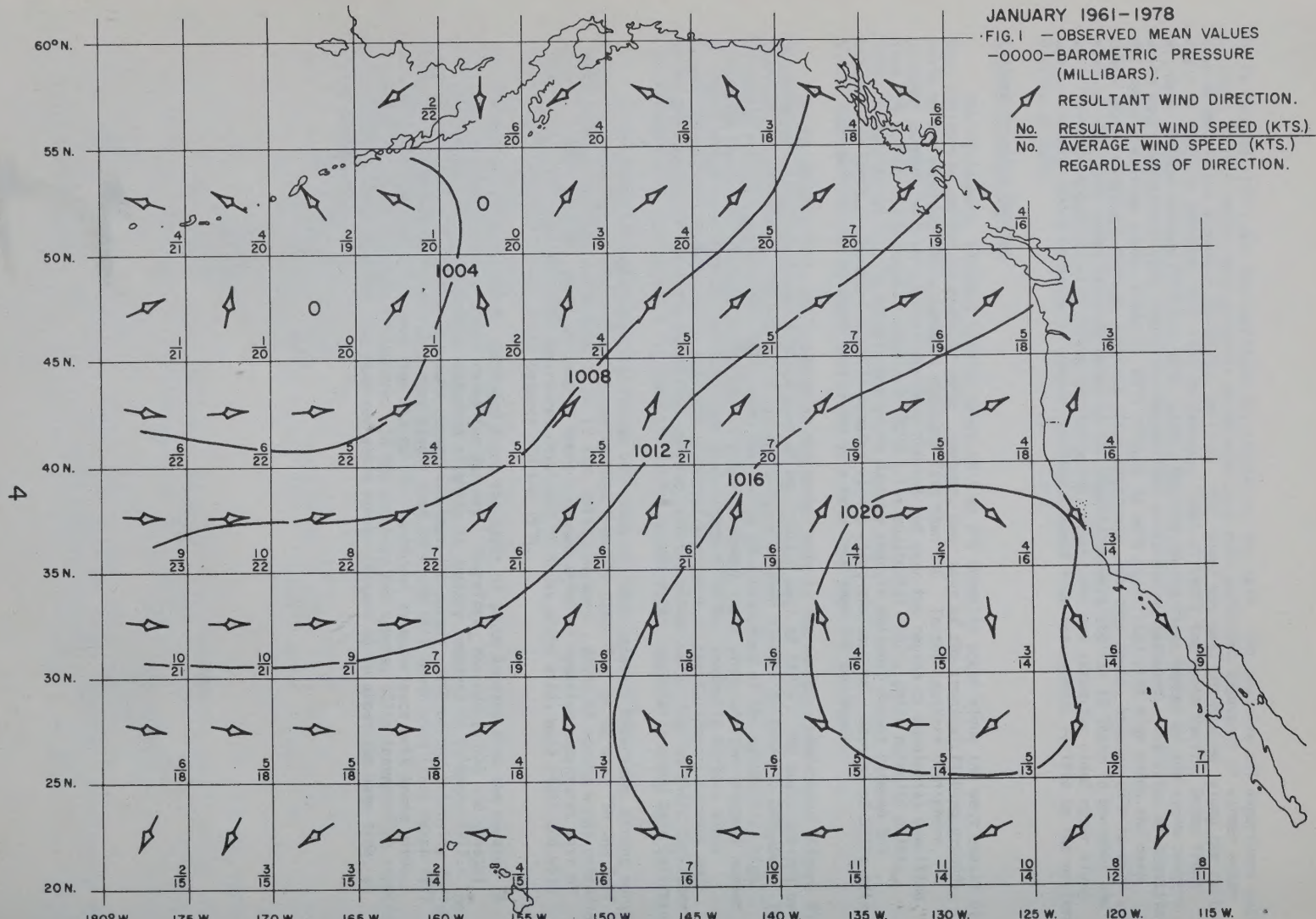
During January, seasonal cooling rates of 1 to 2°C normally occur along the west coasts of Baja California and Mexico north of 18°N. However, over most of the tropical fishing grounds north of the equator, SST's normally decrease less than 1°C. In the southern hemisphere, seasonal warming is 1 to 2.5°C in the Peru Current and over the region of equatorial upwelling from 5°N to 5°S and between Ecuador and 120°W. The equatorial front, which normally exists from the equator to 3°N, is usually weaker in January than in December except between the Galápagos Islands and Ecuador where it remains strong along the equator. Warming of SST's takes place over most of the southern hemisphere at a rate less than 1°C per month.

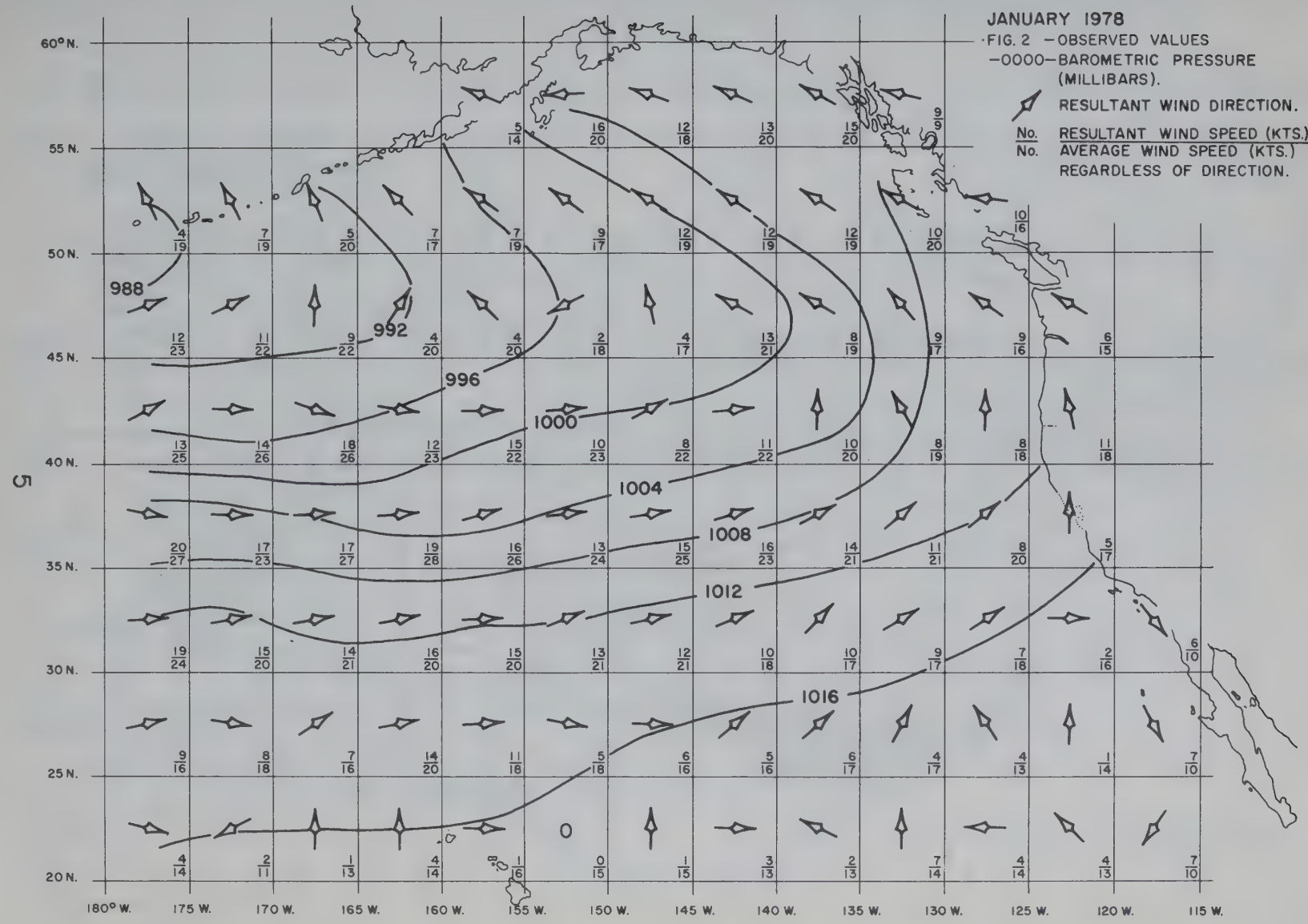
During January 1978, SST's cooled at the normal rate in the northern hemisphere (Figure 8), but remained above normal over a large part of the tropics west of 110°W. The areas covered by positive SST departures from normal in January (Figure 9) were similar to those in December. The extensive areas of above normal SST's were due partly to a breakdown of the subtropical high pressure center over the eastern Pacific, lighter northeast trade winds and the frequent number of storms which developed off the U.S. west coast south of 40°N. Southerly surface winds associated with storm activity reduced the southward transport in the California Current and westward transport in the north equatorial current, and the colder water from northern latitudes did not move south and westward into the tropics at normal rates, especially along Baja California.

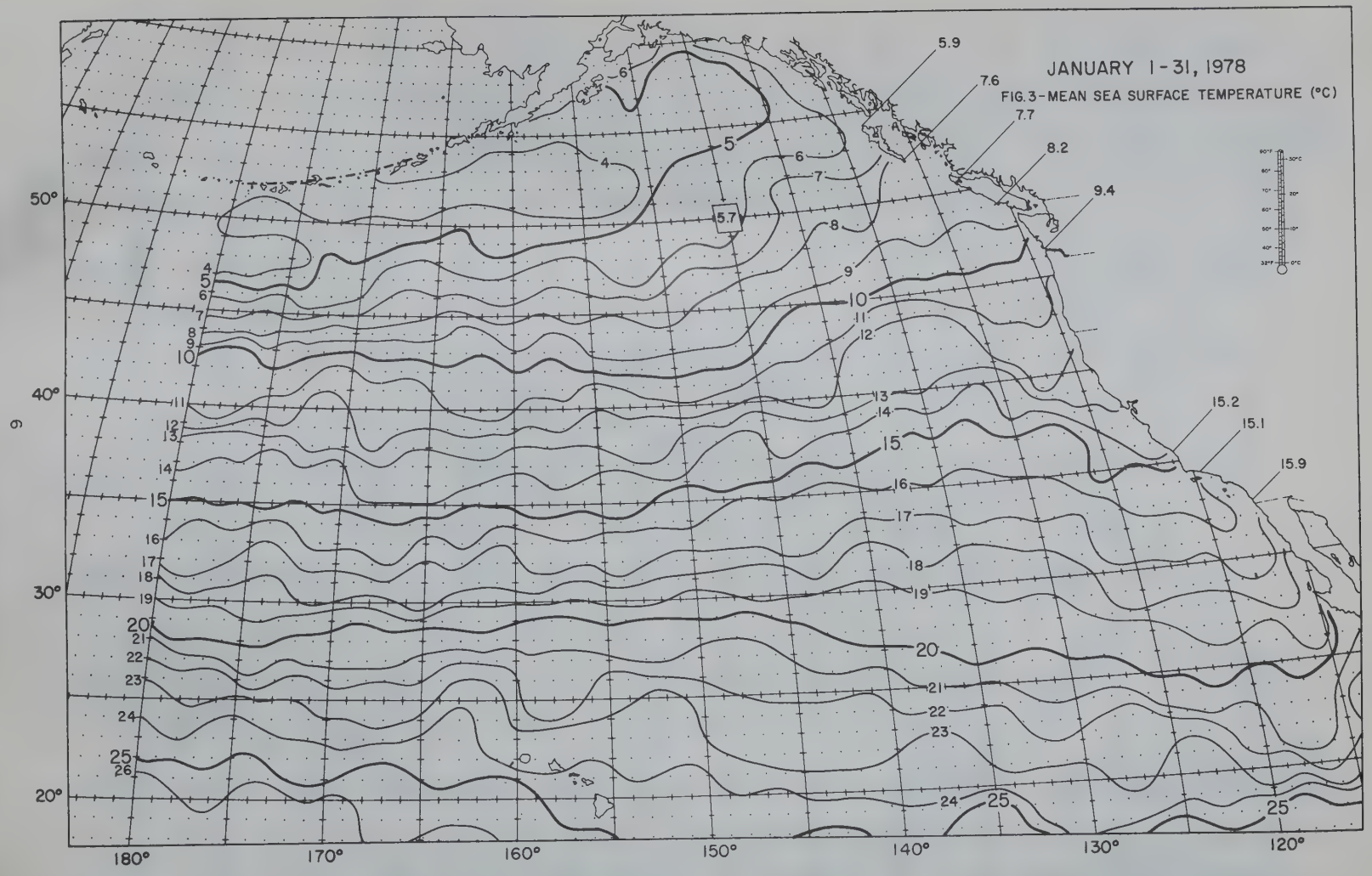
In the Gulfs of Tehuantepec and Panama and along the west coast of Nicaragua, strong north eastward trade winds (over 20 kts) frequently blew from the coast far out to sea. In the Gulf of Tehuantepec, gale force winds blew 10 to 12 days during January. Bands of strong winds extending south and west from the coasts of central America caused areas of negative departures east of 110°W (Figure 9). Positive SST departures developed in areas where winds were light and with only a small amount of cloud cover between 5°N and 15°N.

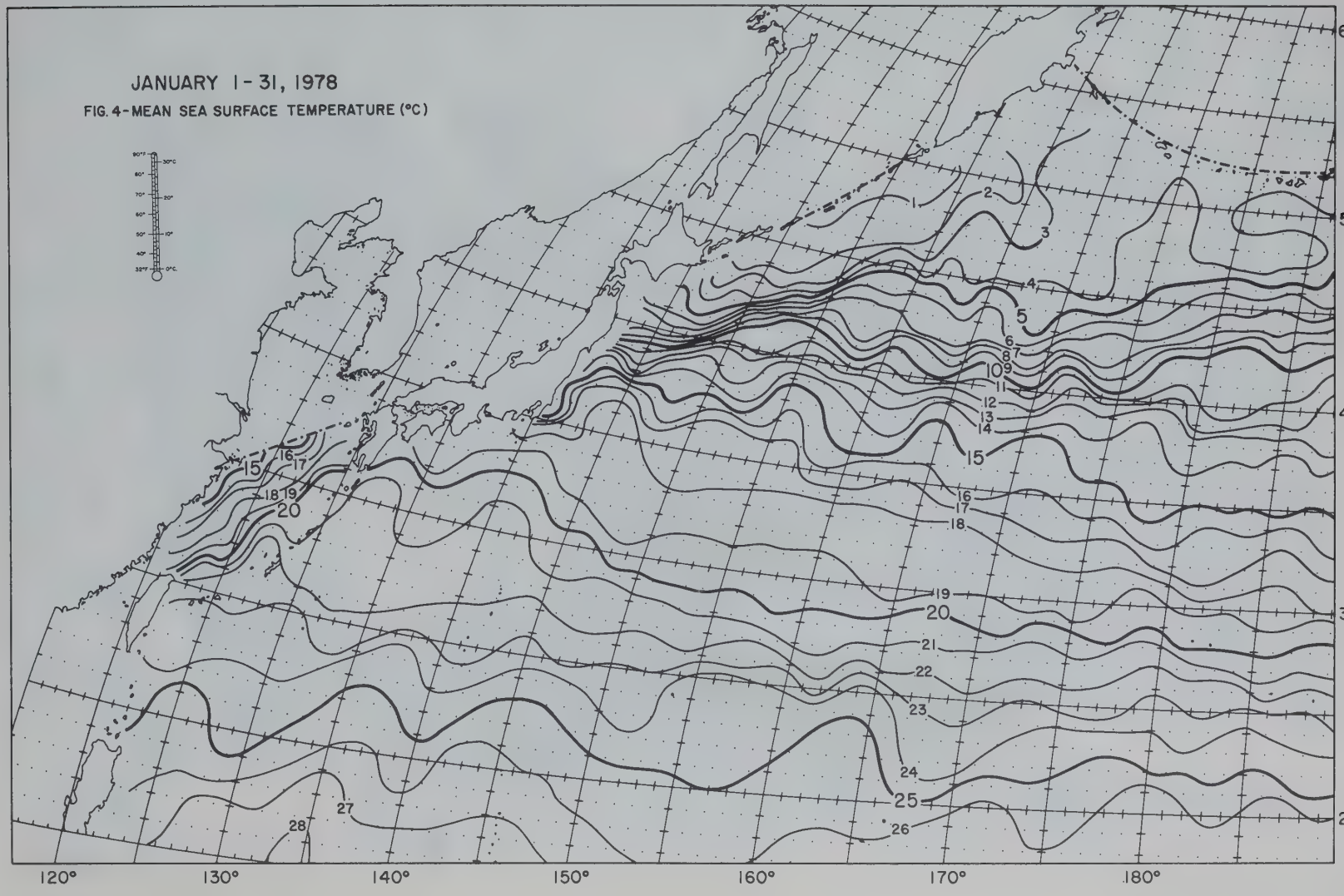
Along the equator east of 130°W and along the coast of South America from the equator to 15°S, SST's warmed at below normal rates for January. Therefore, the equatorial and coastal areas with negative SST departures expanded slightly in January compared to December 1977. The south Pacific subtropical high pressure center was near its normal position and intensity during January. The southeast trades were more steady east of 110°W this month than since March 1977. West of 120°W the equatorial area from 5°N to 5°S continued to experience weak trade winds, especially from the northern hemisphere. In the southern hemisphere, SST's increased at expected seasonal rates west of 120°W, but remained above normal (Figure 9) in about the same areas as during December.

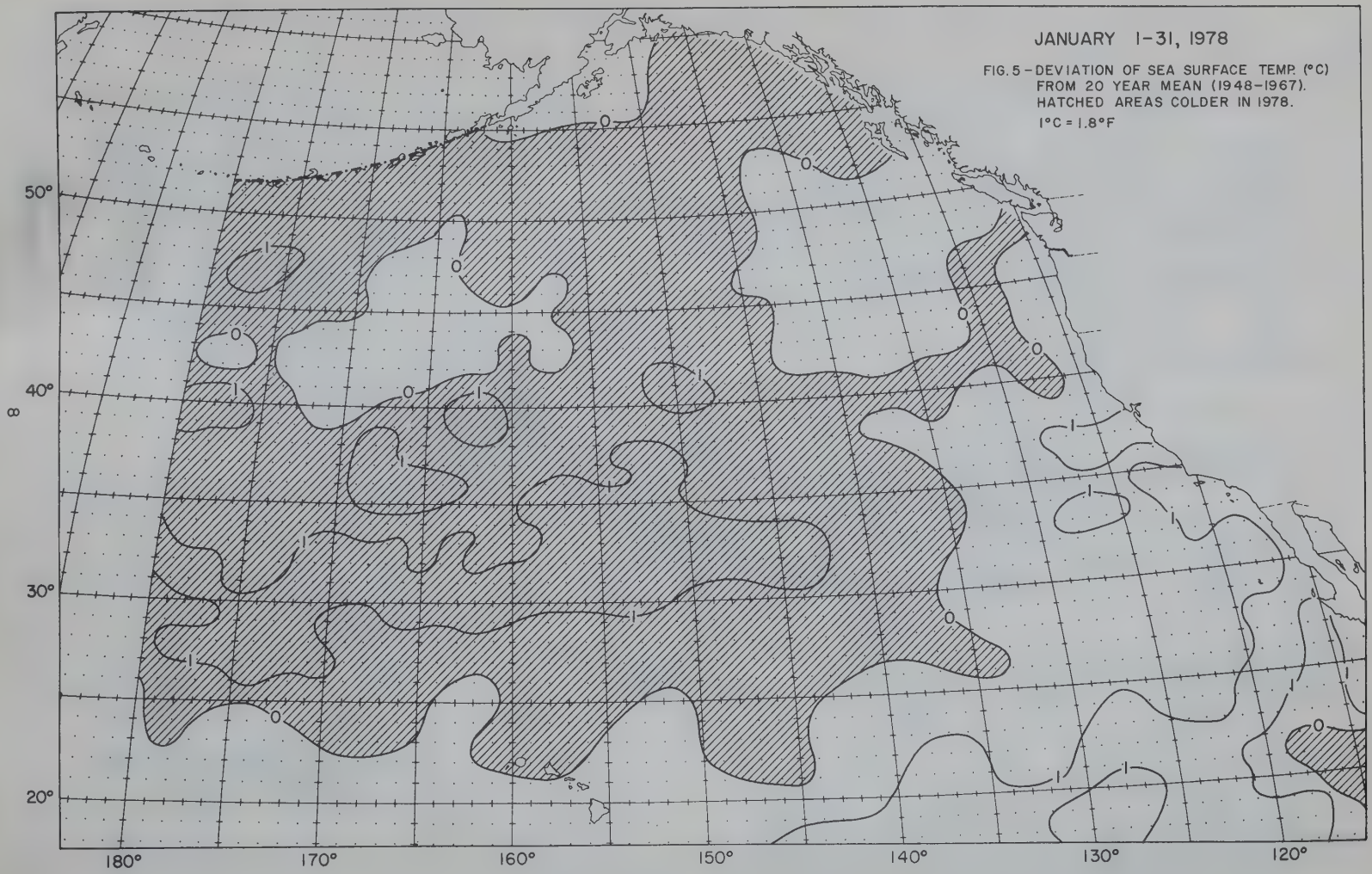


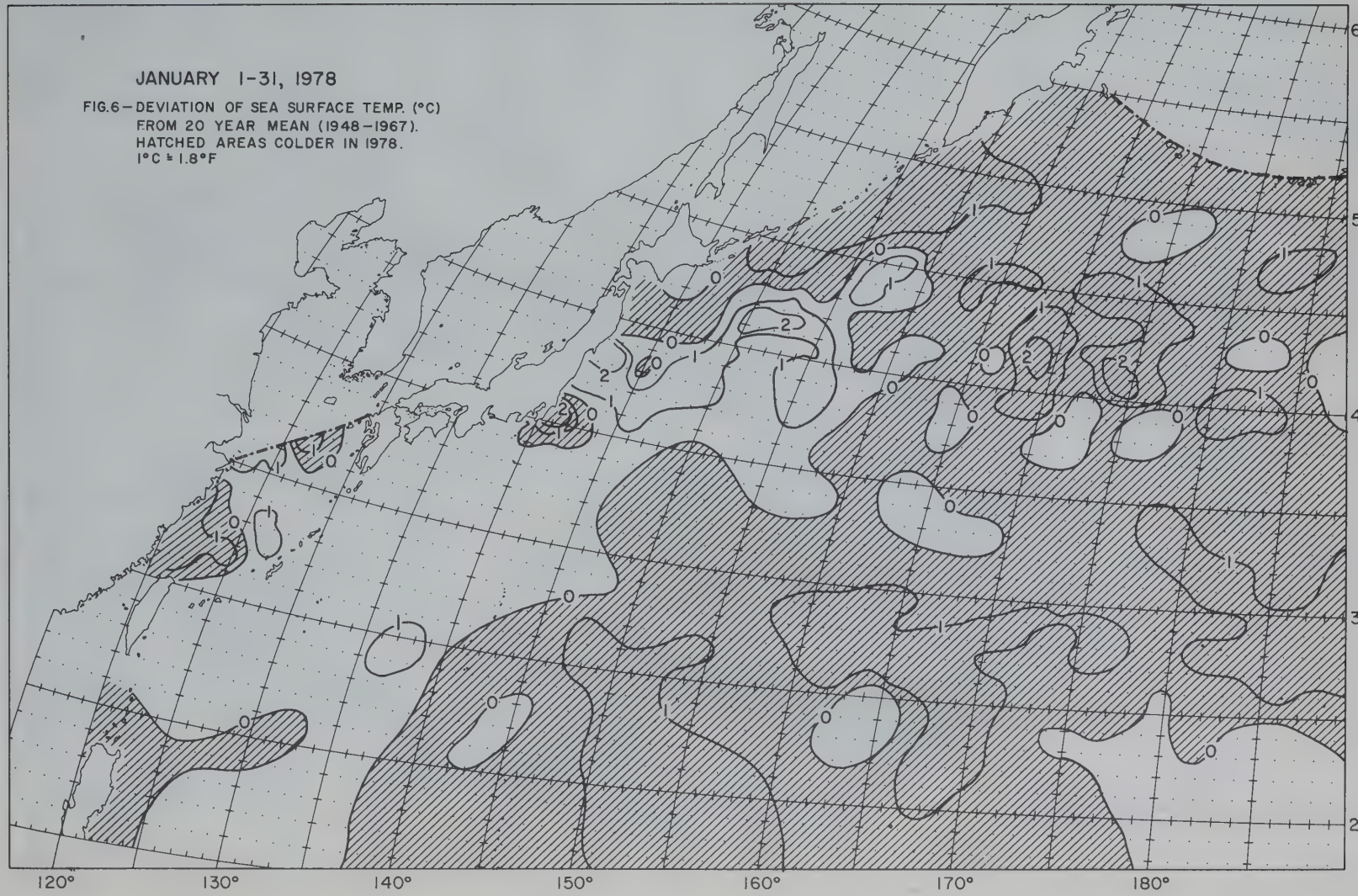

JANUARY 1961–1978
FIG. 1 —OBSERVED MEAN VALUES
—0000—BAROMETRIC PRESSURE (MILLIBARS).
RESULTANT WIND DIRECTION.
No. RESULTANT WIND SPEED (KTS.)
No. AVERAGE WIND SPEED (KTS.) REGARDLESS OF DIRECTION.
1004
1008
1012
1016
1020
60° N.
55 N.
50 N.
45 N.
40 N.
35 N.
30 N.
25 N.
20 N.
180° W.
175 W.
170 W.
165 W.
160 W.
155 W.
150 W.
145 W.
140 W.
135 W.
130 W.
125 W.
120 W.
115 W.

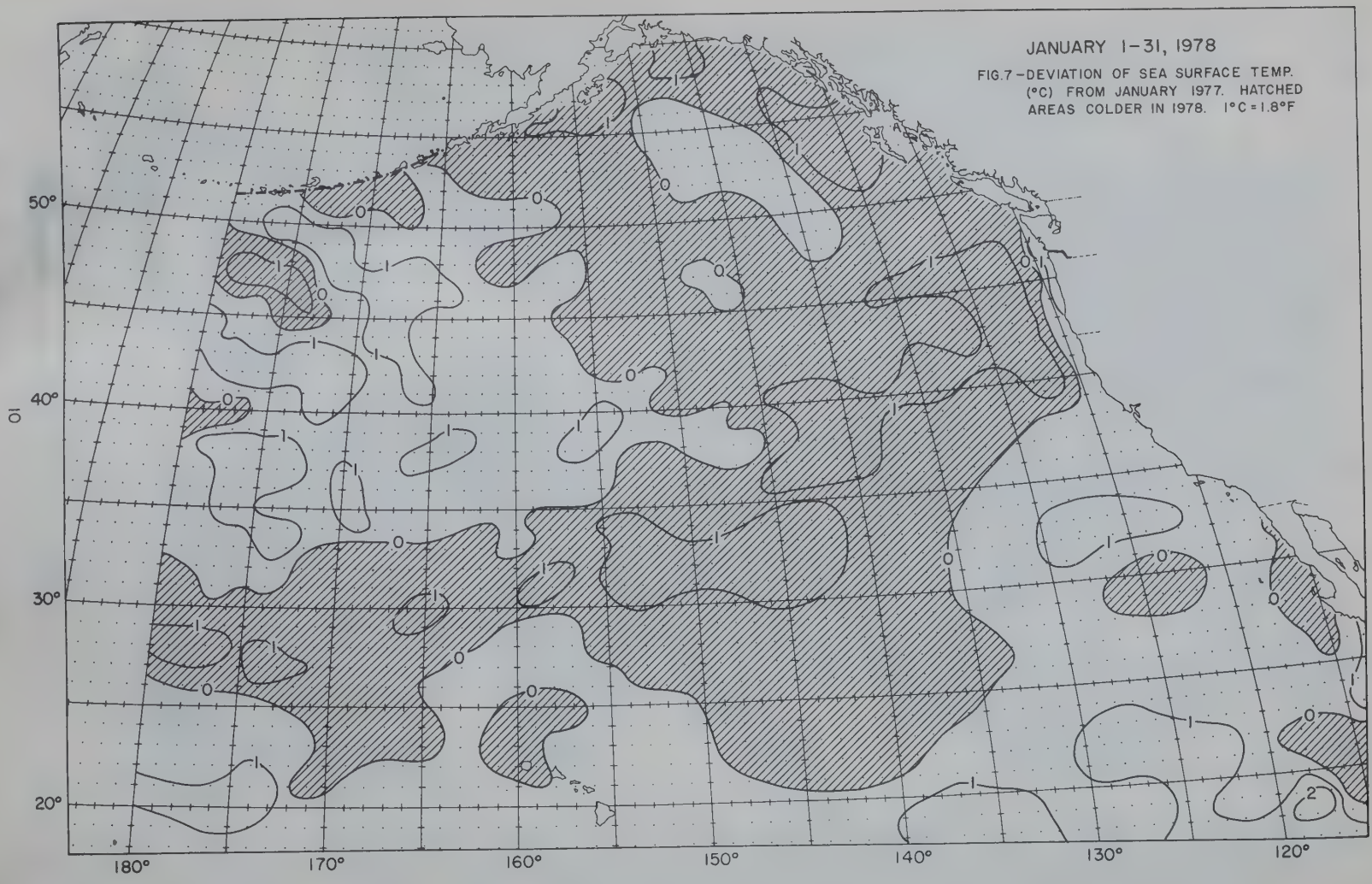

JANUARY 1978
FIG. 2 —OBSERVED VALUES
—0000—BAROMETRIC PRESSURE (MILLIBARS).
RESULTANT WIND DIRECTION.
No. RESULTANT WIND SPEED (KTS.)
No. AVERAGE WIND SPEED (KTS.) REGARDLESS OF DIRECTION.
988
992
996
1000
1004
1008
1012
1016
60° N.
55 N.
50 N.
45 N.
40 N.
35 N.
30 N.
25 N.
20 N.
180° W.
175 W.
170 W.
165 W.
160 W.
155 W.
150 W.
145 W.
140 W.
135 W.
130 W.
125 W.
120 W.
115 W.

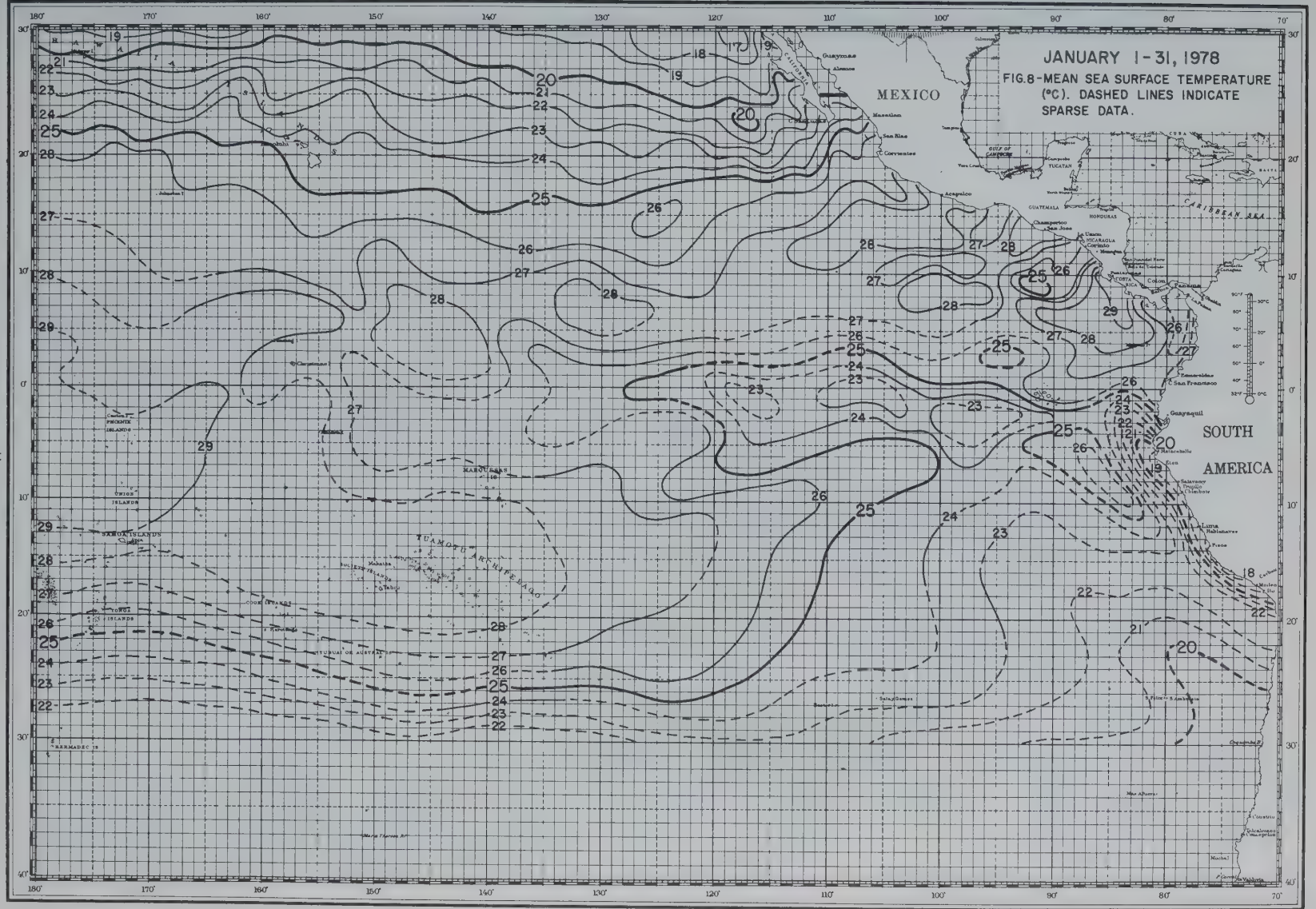

JANUARY 1-31, 1978
FIG. 3-MEAN SEA SURFACE TEMPERATURE (°C)
50°
40°
30°
20°
180°
170°
160°
150°
140°
130°
120°
5.9
7.6
7.7
8.2
9.4
5.7
15.2
15.1
15.9


JANUARY 1 - 31, 1978
FIG. 4 - MEAN SEA SURFACE TEMPERATURE (°C)
60°
50°
40°
30°
20°
120°
130°
140°
150°
160°
170°
180°
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28


JANUARY 1-31, 1978
FIG. 5 - DEVIATION OF SEA SURFACE TEMP. (°C) FROM 20 YEAR MEAN (1948-1967). HATCHED AREAS COLDER IN 1978.
1°C = 1.8°F
50°
40°
30°
20°
180°
170°
160°
150°
140°
130°
120°
0
1


JANUARY 1-31, 1978
FIG.6 – DEVIATION OF SEA SURFACE TEMP. (°C) FROM 20 YEAR MEAN (1948–1967). HATCHED AREAS COLDER IN 1978. 1°C = 1.8°F
60°
50°
40°
30°
20°
120°
130°
140°
150°
160°
170°
180°


JANUARY 1-31, 1978
FIG.7 - DEVIATION OF SEA SURFACE TEMP. (°C) FROM JANUARY 1977. HATCHED AREAS COLDER IN 1978. 1°C = 1.8°F
50°
40°
30°
20°
180°
170°
160°
150°
140°
130°
120°
01


JANUARY 1-31, 1978
FIG.8-MEAN SEA SURFACE TEMPERATURE (°C). DASHED LINES INDICATE SPARSE DATA.
MEXICO
SOUTH AMERICA
CARIBBEAN SEA
GULF OF CALIFORNIA
GUATEMALA
HONDURAS
NICARAGUA
COSTA RICA
PANAMA
GUAYAQUIL
TUAMOTU ARCHIPELAGO
COOK ISLANDS
SAMOA ISLANDS
TONGA ISLANDS
PHOENIX ISLANDS
UNION ISLANDS
MARQUESAS
BERMADEC IS
Acapulco
Manzanillo
San Blas
Corrientes
Guaymas
Almeria
Champerico
San Jose
Colon
Panama
Esmeraldas
San Francisco
Salinas
Salaverry
Pisco
Luna
Tumaco
Buenaventura
Malpelo I.
Cocos I.
Galapagos Is.
Clipperton I.
Johnston I.
Palmyra I.
Christmas I.
Fanning I.
Tahiti
Raivavae
Rapa
Rurutu
Tubuai
Mangareva
Pitcairn I.
Easter I.
Juan Fernandez Is.
Salas Gomez
Mas Afuera
Mas a Tierra
Robinson Crusoe I.
Alexander Selkirk I.
Valparaiso
Mocha I.
Guadalupe I.
Revillagigedo Is.
Socorro I.
Roca Partida
Mazatlan
Yucatan
Campeche
Veracruz
Tampico
Cuba
Haiti
Jamaica
Belize
Roatan
Swan Is.
Providencia
Quita Sueno
Serrana
Serranilla
Misteriosa
Bajo Nuevo
Roncador
Quita Sueno
Nicaragua
Corinto
Acajutla
Salvador
Tehuantepec
Chilca
Huacho
Callao
Pisco
Nazca
Ica
Arica
Iquique
Antofagasta
Caldera
Coquimbo
Valparaiso
Talcahuano
Concepcion
Corral
Valdivia
Mocha
Juan Fernandez
Easter
Pitcairn
Gambier
Tuamotu
Society
Tubuai
Austral
Cook
Samoa
Tonga
Fiji
Phoenix
Union
Marquesas
Bermadec
Clipperton
Socorro
Revillagigedo
Roca Partida
Guadalupe
Cocos
Galapagos
Malpelo
Buenaventura
Tumaco
Esmeraldas
Manta
Salinas
Guayaquil
Tumbes
Paita
Pisco
Callao
Huacho
Chimbote
Salaverry
Trujillo
Pacasmayo
Eten
Chiclayo
Paita
Talara
Tumbes
Guayaquil
Manta
Esmeraldas
San Francisco
Tumaco
Buenaventura
Malpelo I.
Cocos I.
Galapagos Is.
Clipperton I.
Socorro I.
Roca Partida
Revillagigedo Is.
Guadalupe I.
Mazatlan
Guaymas
Almeria
Manzanillo
Acapulco
Salina Cruz
Champerico
San Jose
Corinto
Acajutla
La Union
Corinto
Colon
Panama
Puerto Limon
Puerto Cortes
Belize
Progreso
Campeche
Veracruz
Tampico
Yucatan
Cuba
Haiti
Jamaica
Swan Is.
Providencia
Quita Sueno
Serrana
Serranilla
Misteriosa
Bajo Nuevo
Roncador
Nicaragua
Honduras
Guatemala
Costa Rica
Panama
Caribbean Sea
Gulf of California
Gulf of Campeche
Yucatan
Baffin
Bermuda
Florida
Cuba
Haiti
Jamaica
Belize
Roatan
Swan Is.
Providencia
Quita Sueno
Serrana
Serranilla
Misteriosa
Bajo Nuevo
Roncador
Nicaragua
Honduras
Guatemala
Costa Rica
Panama
Caribbean Sea
Gulf of California
Gulf of Campeche
Yucatan
Baffin
Bermuda
Florida
Cuba
Haiti
Jamaica
Belize
Roatan
Swan Is.
Providencia
Quita Sueno
Serrana
Serranilla
Misteriosa
Bajo Nuevo
Roncador
Nicaragua
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Guatemala
Costa Rica
Panama
Caribbean Sea
Gulf of California
Gulf of Campeche
Yucatan
Baffin
Bermuda
Florida

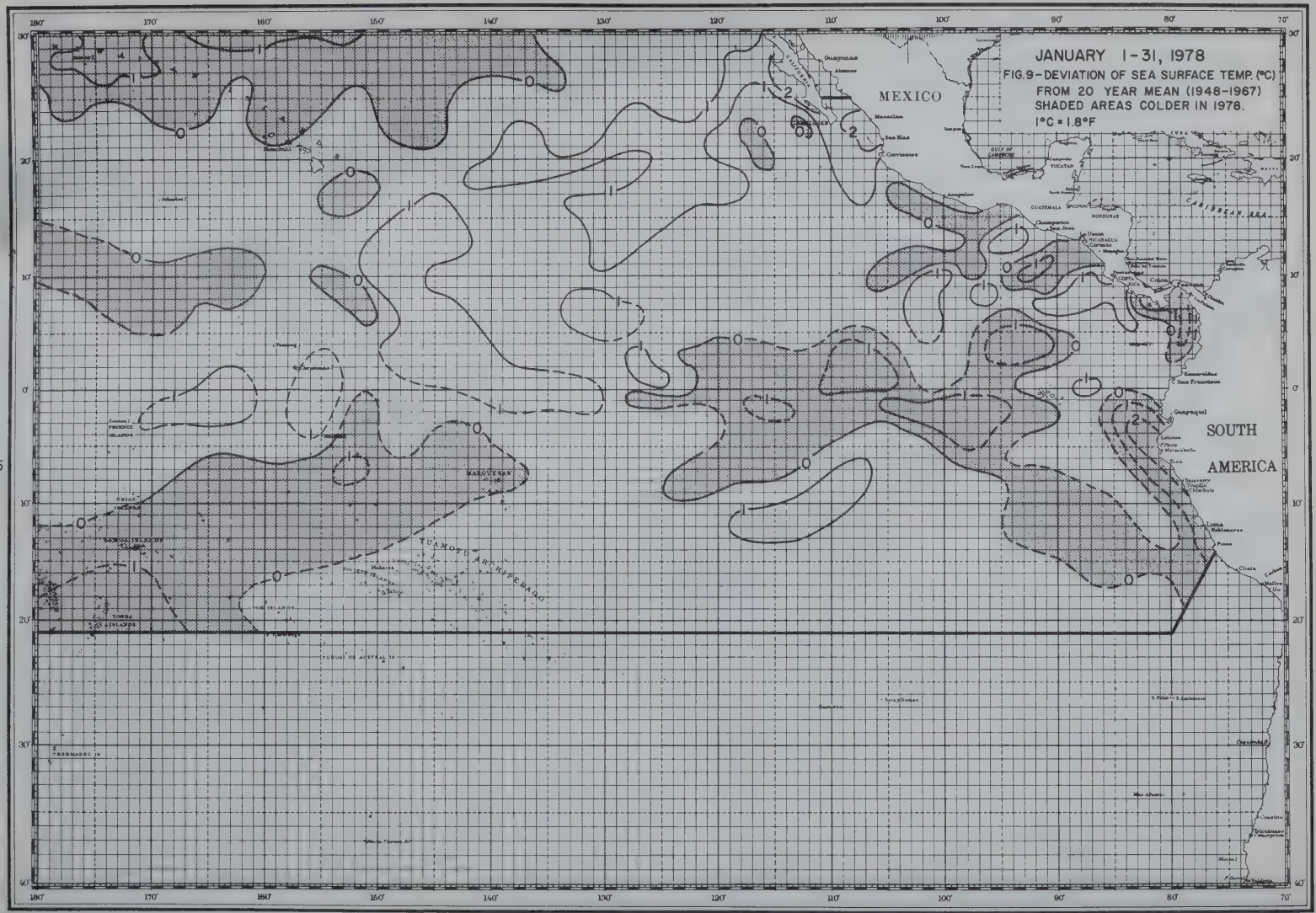
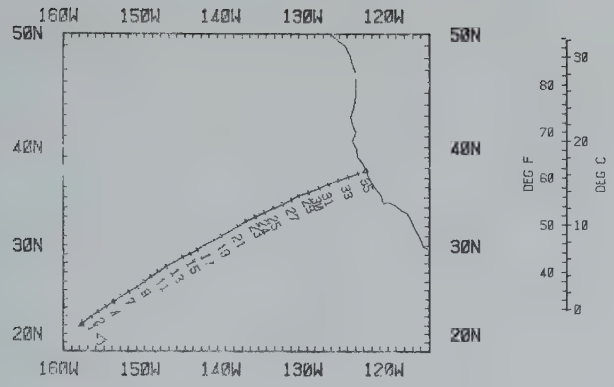

JANUARY 1-31, 1978
FIG.9-DEVIATION OF SEA SURFACE TEMP. (°C)
FROM 20 YEAR MEAN (1948-1967)
SHADED AREAS COLDER IN 1978.
1°C = 1.8°F
MEXICO
SOUTH
AMERICA
TUAMOTU ARCHIPELAGO
MARQUESAS
180°
170°
160°
150°
140°
130°
120°
110°
100°
90°
80°
70°
30°
20°
10°
0°
40°

FIGURE 10



SHIP HAWAIIAN QUEEN
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07 JAN 1978 - 13 JAN 1978
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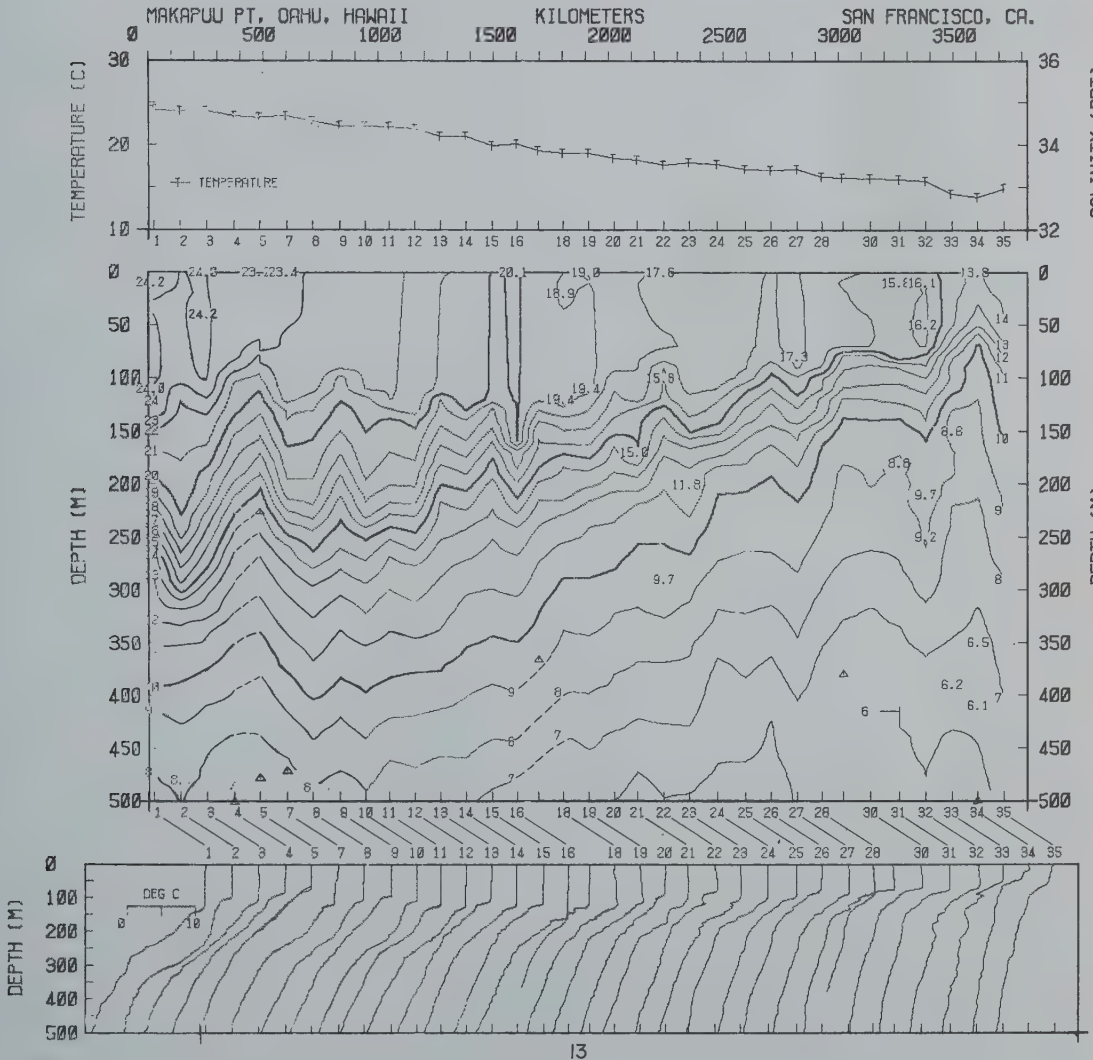
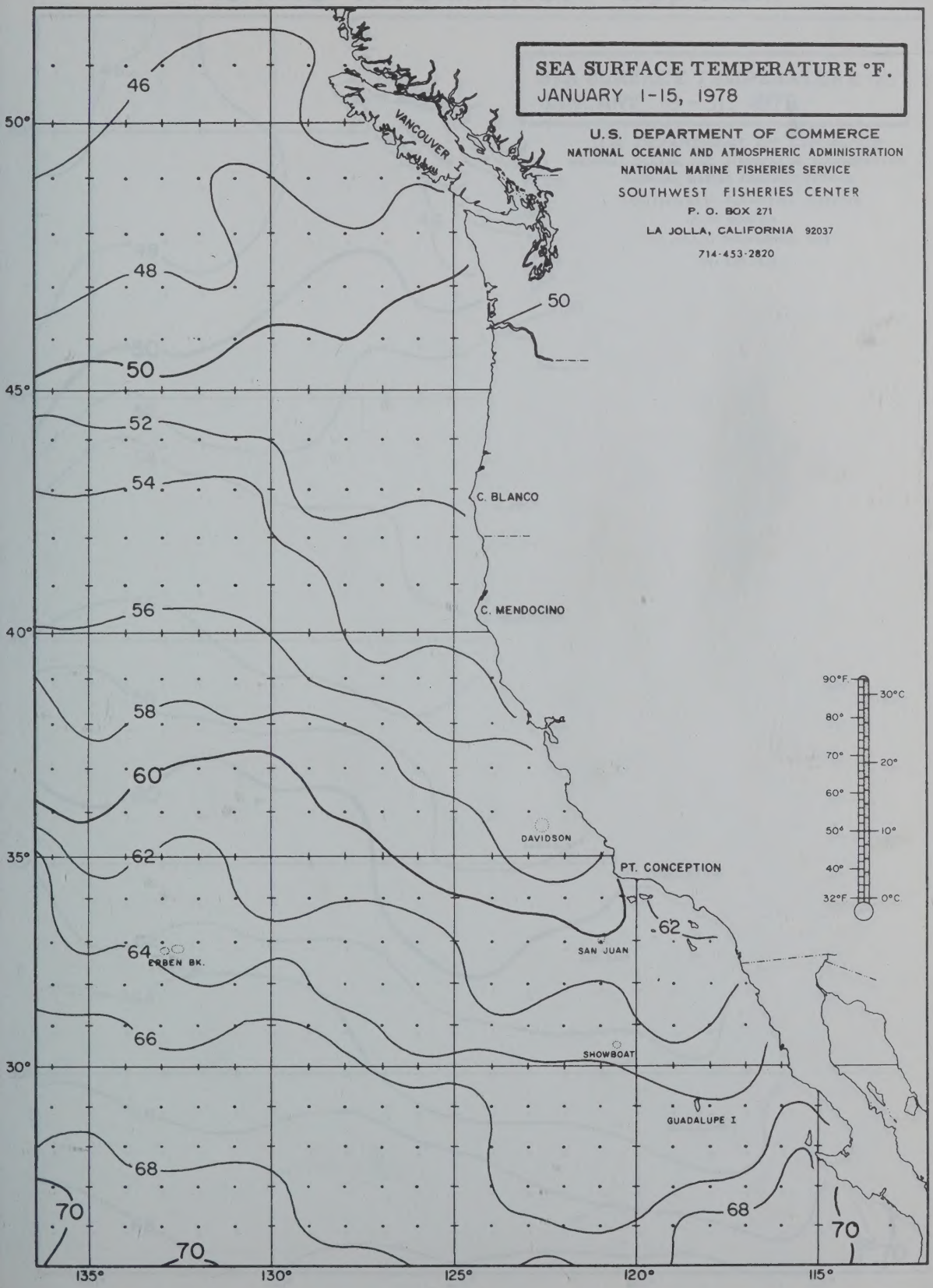
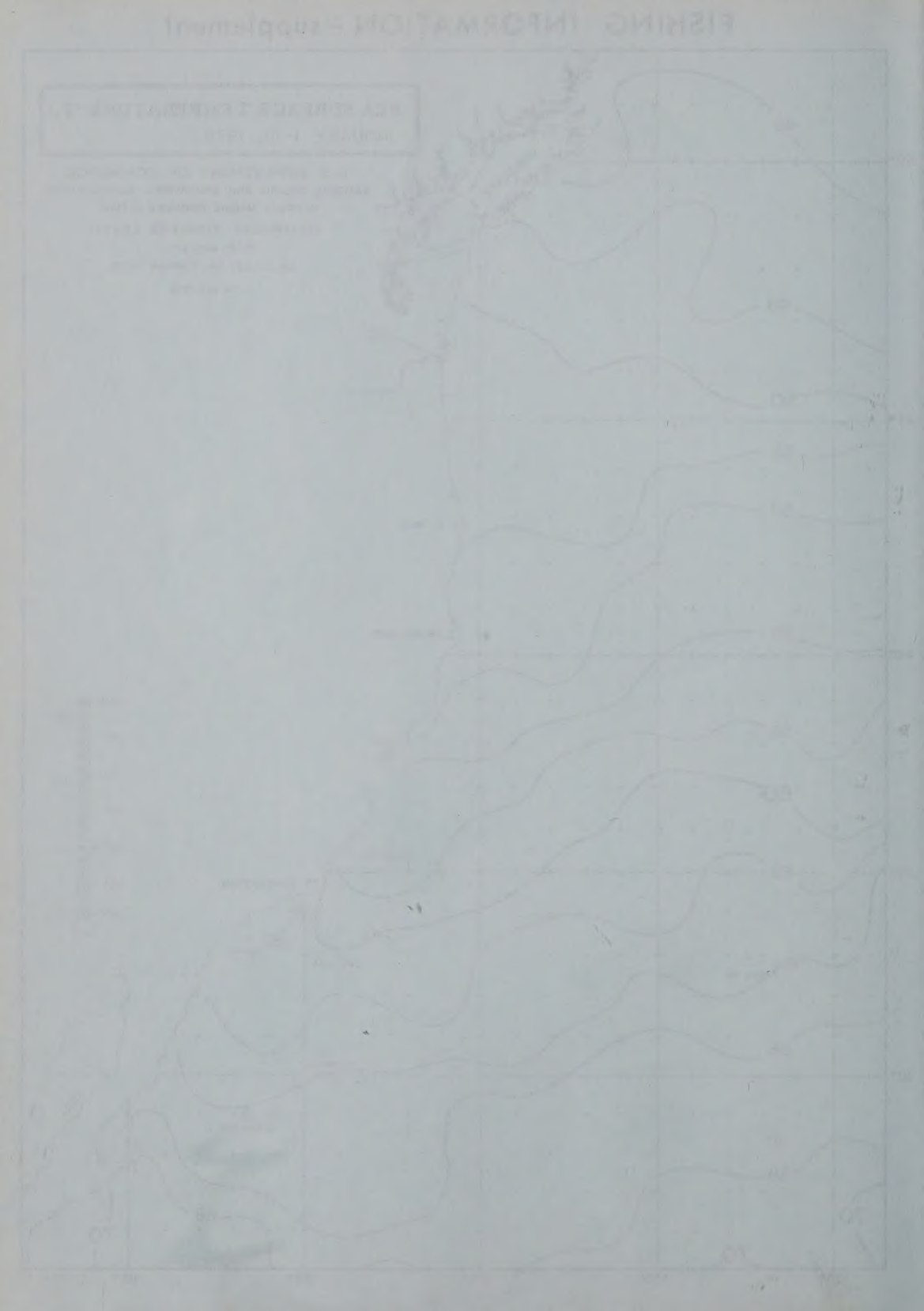


FISHING INFORMATION – supplement





FISHING INFORMATION – supplement